Teacher's Scoring Guide

Grade 9
Mathematics

Fall 2007

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Indiana Statewide Testing for Educational Progress

49933-W

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INTRODUCTION

During the fall of 2007, Indiana students in Grades 3 through 10 participated in the administration of *ISTEP+*. The test for *ISTEP+* Fall 2007 consisted of a multiple-choice section and an applied skills section. For the fall testing, the multiple-choice section was machine-scored. The applied skills section, which consisted of open-ended questions, was hand-scored.

The test results for both the multiple-choice and the applied skills sections were returned to the schools in late November 2007. Copies of student responses to the open-ended questions were returned to the schools in early December 2007. It is the expectation of the Indiana Department of Education that schools will take this opportunity to invite students and parents to sit down with teachers to discuss the results. To support this endeavor, the Indiana Department of Education has prepared the following *Teacher's Scoring Guid*e. The purpose of this guide is to help teachers to:

- understand the methods used to score the *ISTEP+* Fall 2007 applied skills section, and
- discuss and interpret these results with students and parents.

In order to use this guide effectively, you will also need the Student Report and a copy of the student's work.

There are two scoring guides for Grade 9, English/Language Arts and Mathematics. In this Mathematics guide, you will find:

- an introduction,
- a list of the Mathematics Grade 8 Indiana Academic Standards,*
- rubrics (scoring rules) used to score the open-ended questions,
- anchor papers that are actual examples of student work (transcribed in this guide for clarity and ease of reading), and
- descriptions of the ways in which the response meets the rubric criteria for each of the score points.

When you review the contents of the scoring guide, keep in mind that this guide is an overview. If you have questions, write via e-mail (istep@doe.state.in.us) or call the Indiana Department of Education at (317) 232-9050.

* Because *ISTEP+* is administered early in the fall, the Grade 9 test is based on the academic standards through Grade 8.

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INTRODUCTION TO THE MATHEMATICS APPLIED SKILLS SECTION

The applied skills section that students responded to this past fall in Grade 9 allowed the students to demonstrate their understanding of Mathematics in a variety of ways, such as applying formulas, explaining a solution, transforming a figure, or interpreting a table or graph.

STRUCTURE

The applied skills section for Grade 9 Mathematics was divided into two tests, Test 7 and Test 8. Each test consisted of eight open-ended questions. Students were permitted to use calculators on Test 8 but **not** on Test 7.

SCORING

Each open-ended question was scored according to its own rubric. A rubric is a description of student performance that clearly articulates the requirements for each of the score points. Scoring rubrics are essential because they ensure that all papers are scored objectively. Each rubric for this administration of the *ISTEP+* Grade 9 Mathematics assessment has a maximum possible score of two or three score points.

NOTE: Images of the questions and student work have been reduced to fit the format of this guide. As a result, figures and diagrams in measurement questions will appear smaller in this guide than in the actual test book.

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Rubrics are established prior to testing to describe the performance criteria for each score point. The performance criteria determine the number of score points possible for each question. This process ensures that all responses are judged objectively.

1. Students should not be penalized for omitting:
   - degree symbols
   - dollar signs ($) or cent signs (¢)
   - zeros for place holders; for example, either 0.75 or .750 could be used
   - labels for word problems; for example, *miles*

     NOTE: Students WILL be penalized for use of incorrect labels.

2. Students should not be penalized for:
   - spelling or grammar errors
   - using abbreviations; for example, *ft* or *feet* would be acceptable

3. Students should be given credit for:
   - entries in the workspace that indicate understanding of a complete process even if the response on the answer line is incorrect (i.e., the student would receive partial credit for questions with rubrics that allow for scoring the work)
   - answers not written on the answer line; for example, an answer could be given in the workspace or in the explanation (however, in some cases, because of the multiple calculations in the workspace, placement of an answer on the answer line is necessary to determine which response the student intended). Students WILL be penalized for incorrect answers written on the answer line even if the correct answer appears in the workspace.

4. Students should be given credit for:
   - bar graphs with bars of any width
   - bar graphs with either horizontal or vertical bars
   - circle graphs with data presented in any order
   - line graphs only if lines connect the points

CONDITION CODES

If a response is unscorable, it is assigned one of the following condition codes:

A Blank/No response/Refusal
B Illegible
C Written predominantly in a language other than English
D Insufficient response/Copied from text

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MATHEMATICS GRADE 8
INDIANA ACADEMIC STANDARDS

- **Number Sense**
  Students know the properties of rational and irrational numbers expressed in a variety of forms. They understand and use exponents, powers, and roots.

- **Computation**
  Students compute with rational numbers expressed in a variety of forms. They solve problems involving ratios, proportions, and percentages.

- **Algebra and Functions**
  Students solve simple linear equations and inequalities. They interpret and evaluate expressions involving integer powers. They graph and interpret functions. They understand the concepts of slope and rate.

- **Geometry**
  Students deepen their understanding of plane and solid geometric shapes and properties by constructing shapes that meet given conditions, by identifying attributes of shapes, and by applying geometric concepts to solve problems.

- **Measurement**
  Students convert between units of measure and use rates and scale factors to solve problems. They compute the perimeter, area, and volume of geometric objects. They investigate how perimeter, area, and volume are affected by changes of scale.

- **Data Analysis and Probability**
  Students collect, organize, represent, and interpret relationships in data sets that have one or more variables. They determine probabilities and use them to make predictions about events.

- **Problem Solving**
  Students make decisions about how to approach problems and communicate their ideas. Students use strategies, skills, and concepts in finding and communicating solutions to problems. Students determine when a solution is complete and reasonable, and move beyond a particular problem by generalizing to other situations.

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Problem Solving is identified as a Process Skill in the Indiana Academic Standards. To ensure that the *ISTEP+* questions that assess this Process Skill are grade-appropriate and that the questions use skills that are contained in the standards, these questions are developed by including at least two different indicators from Content Skills in addition to the indicator from the Process Skill. Some of the Content Standards included in the Content Skills are Computation, Geometry, and Algebra. The additional indicators may be from the same or different Content Skills.

The Content Skills used for each of the Process Skill questions in the Grade 9 applied skills section are shown in the following chart.

PROCESS SKILL QUESTIONS

Question	Process Skill	Content Skills *Item may map to more than one indicator in a standard.*
Test 7		
2	Problem Solving	Computation, Measurement
Test 8		
5	Problem Solving	Geometry, Measurement
6	Problem Solving	Computation, Measurement
7	Problem Solving	Computation, Measurement

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Test 7—Question 1: Algebra and Functions

1 What is the slope of the graph of the equation $3x + 3y = 18$?

Show All Work

Answer _____

Exemplary Response:

- $^{-}1$

Sample Process:

- $3x + 3y = 18$

  $3y = {}^{-}3x + 18$

  $y = {}^{-}1x + 6$

OR

- Other valid process

NOTE: If the correct coefficient of x is shown in slope-intercept form, award 1 point.

Rubric:

2 points	Exemplary response
1 point	Correct complete process; error in computation
0 points	Other

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SCORE POINT 2

1 What is the slope of the graph of the equation $3x + 3y = 18$?

Show All Work

$$3x + 3y = 18$$
$$3x + -3x + 3y = 18 + -3x$$
$$\frac{3y}{3} = \frac{-3x + 18}{3}$$
$$y = -1x + 6$$

Answer -1

Test 7—Question 1 Score Point 2

This response matches the exemplary response contained in the rubric. The student shows the correct answer of $^{-}1$. The response receives a Score Point 2.

SCORE POINT 1

1 What is the slope of the graph of the equation $3x + 3y = 18$?

Show All Work

$$3x - 3x + 3y = 18 - 3x$$
$$\frac{3y}{3} = \frac{18 - 3x}{3}$$
$$y = 6 - x$$
$$y = -x + 6$$

Answer y = -x + 6

Test 7—Question 1 Score Point 1

This response shows a correct complete process, but the student writes the equation on the answer line instead of the slope. Therefore, this response receives a Score Point 1.

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Test 7—Question 1
Score Point 0

This response shows an incorrect answer and an incorrect process. Therefore, this response receives a Score Point 0.

SCORE POINT 0

1 What is the slope of the graph of the equation $3x + 3y = 18$?

Show All Work

$$3x + \frac{3y}{3} = \frac{18}{3} \qquad y = 3x + 6$$

Answer $3/1$

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Test 7—Question 2: Problem Solving

2 ABC Toaster Company manufactures two types of toasters, standard and deluxe. A deluxe toaster takes twice as long to make as a standard toaster.

It takes John 8 MINUTES to assemble a standard toaster. Last week he spent 40 HOURS assembling standard toasters and 40 HOURS this week assembling deluxe toasters.

How many more standard toasters than deluxe toasters can John assemble in 40 HOURS of work?

Show All Work

Answer _____ standard toasters

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Exemplary Response:

- 150

AND

- Correct complete process

Sample Process:

- $1 \text{ hour} = 60 \text{ minutes}$

$60 \times 40 = 2{,}400 \text{ minutes}$

$2{,}400 \div 8 = 300 \text{ standard toasters}$

$2{,}400 \div 16 = 150 \text{ deluxe toasters}$

$300 - 150 = 150$

OR

- Other valid process

Rubric:

3 points	Exemplary response
2 points	Correct complete process; error in computation OR Correct process for determining total number of one type of toaster
1 point	Correct process for conversion of time OR Correct process for determining toasters per hour
0 points	Other

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SCORE POINT 3

2 ABC Toaster Company manufactures two types of toasters, standard and deluxe. A deluxe toaster takes twice as long to make as a standard toaster.

It takes John 8 MINUTES to assemble a standard toaster. Last week he spent 40 HOURS assembling standard toasters and 40 HOURS this week assembling deluxe toasters.

How many more standard toasters than deluxe toasters can John assemble in 40 HOURS of work?

Show All Work

$$\begin{array}{r} 40 \\ \times\ 60 \\ \hline 2{,}400 \end{array} \qquad \frac{2{,}400}{8} = 300 \qquad \frac{2400}{16} = 150$$

$$300 - 150 = 150$$

$$16\overline{)2400}\ \begin{array}{r} 150 \\ 16\downarrow \\ \hline 80 \end{array}$$

Answer 150 standard toasters

Test 7—Question 2 Score Point 3

This response matches the exemplary response contained in the rubric. The student shows the correct answer of 150 and shows a correct complete process. The response receives a Score Point 3.

SCORE POINT 2

2 ABC Toaster Company manufactures two types of toasters, standard and deluxe. A deluxe toaster takes twice as long to make as a standard toaster.

It takes John 8 MINUTES to assemble a standard toaster. Last week he spent 40 HOURS assembling standard toasters and 40 HOURS this week assembling deluxe toasters.

How many more standard toasters than deluxe toasters can John assemble in 40 HOURS of work?

Show All Work

$$\begin{array}{r} 40 \\ \times\ 60 \\ \hline 2400 \end{array} \qquad 8\overline{)2400}\ \begin{array}{r} 300 \\ 24\downarrow \\ \hline 000 \end{array}$$

$$\begin{array}{r} {\scriptstyle 3}\,16 \\ \times\ 5 \\ \hline 80 \end{array} \qquad \begin{array}{r} 300 \\ 130 \\ \hline 170 \end{array}$$

$$16\overline{)2400}\ \begin{array}{r} 130 \\ 16\downarrow \\ \hline 80 \\ 80\downarrow \\ \hline 00 \end{array}$$

Answer 170 standard toasters

Test 7—Question 2 Score Point 2

This response shows a correct complete process, but a computational error results in an incorrect answer. The computational error is made when the student divides 2,400 by 16, getting 130 instead of 150. Therefore, this response receives a Score Point 2.

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Test 7—Question 2
Score Point 1

This response shows an incorrect answer on the answer line. However, the student shows a correct process for converting hours into minutes. Therefore, this response receives a Score Point 1.

SCORE POINT 1

2 ABC Toaster Company manufactures two types of toasters, standard and deluxe. A deluxe toaster takes twice as long to make as a standard toaster.

It takes John 8 MINUTES to assemble a standard toaster. Last week he spent 40 HOURS assembling standard toasters and 40 HOURS this week assembling deluxe toasters.

How many more standard toasters than deluxe toasters can John assemble in 40 HOURS of work?

Show All Work $\frac{8}{40}$ $\quad \begin{array}{r} 60 \\ \times\ 40 \\ \hline 2400 \end{array}$

$\frac{8}{2400} = 300$

Answer 300 standard toasters

Test 7—Question 2
Score Point 0

This response shows an incorrect answer and an incorrect process. Therefore, this response receives a Score Point 0.

SCORE POINT 0

2 ABC Toaster Company manufactures two types of toasters, standard and deluxe. A deluxe toaster takes twice as long to make as a standard toaster.

It takes John 8 MINUTES to assemble a standard toaster. Last week he spent 40 HOURS assembling standard toasters and 40 HOURS this week assembling deluxe toasters.

How many more standard toasters than deluxe toasters can John assemble in 40 HOURS of work?

Show All Work

8 min = 40 hours
5 toasters
16 min = 40 hours
2.5 toasters

$$16\overline{)40.0} \quad 2.5, \ 32, \ 80$$

Answer 2.5 standard toasters

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Test 7—Question 3: Algebra and Functions

3 The manager at Express Mart is using $1,000 to restock the chip aisle and the water aisle. He orders bags of chips for $1.50 per bag and cases of water for $2.00 per case.

Write an inequality that represents the number of bags of chips, c, and the number of cases of water, w, the manager can order.

Inequality _____

Exemplary Response:

- $1.5c + 2w \leq 1{,}000$

OR

- Other valid inequality

Rubric:

2 points	Exemplary response
1 point	Correct equation OR Correct values for inequality with inequality sign reversed OR Correct values for inequality with correct less-than or greater-than symbol
0 points	Other

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Test 7—Question 3
Score Point 2

This response matches the exemplary response contained in the rubric. The student gives a correct inequality. The response receives a Score Point 2.

SCORE POINT 2

3 The manager at Express Mart is using $1,000 to restock the chip aisle and the water aisle. He orders bags of chips for $1.50 per bag and cases of water for $2.00 per case.

Write an inequality that represents the number of bags of chips, c, and the number of cases of water, w, the manager can order.

Inequality $(c \cdot 1.50) + (w \cdot 2) \leq 1{,}000$

Test 7—Question 3
Score Point 1

This response gives the correct values in the inequality. However, the student shows an incorrect inequality sign. Therefore, this response receives a Score Point 1.

SCORE POINT 1

3 The manager at Express Mart is using $1,000 to restock the chip aisle and the water aisle. He orders bags of chips for $1.50 per bag and cases of water for $2.00 per case.

Write an inequality that represents the number of bags of chips, c, and the number of cases of water, w, the manager can order.

Inequality $1.50c + 2w \geq 1000$

Test 7—Question 3
Score Point 0

This response shows an incorrect equation. Therefore, this response receives a Score Point 0.

SCORE POINT 0

3 The manager at Express Mart is using $1,000 to restock the chip aisle and the water aisle. He orders bags of chips for $1.50 per bag and cases of water for $2.00 per case.

Write an inequality that represents the number of bags of chips, c, and the number of cases of water, w, the manager can order.

Inequality $150c + 200w = 1000$

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Test 7—Question 4: Measurement

4 Lisa works 45 minutes each day building shelves for her home. She completes the shelves in 12 days.

How many HOURS does it take Lisa to build the shelves?

Show All Work

Answer_____ hours

Exemplary Response:

- 9 hours

Sample Process:

- $45 \times 12 = 540$ minutes

  $\frac{540}{60} = 9$ hours

OR

- Other valid process

Rubric:

2 points	Exemplary response
1 point	Correct complete process; error in computation
0 points	Other

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Test 7—Question 4
Score Point 2

This response matches the exemplary response contained in the rubric. The student shows a correct answer of 9 hours. The response receives a Score Point 2.

SCORE POINT 2

4 Lisa works 45 minutes each day building shelves for her home. She completes the shelves in 12 days.

How many HOURS does it take Lisa to build the shelves?

Show All Work

$$\begin{array}{r} {\scriptstyle 1} \\ .75\text{hr} \\ \times\ 12\ \text{days} \\ \hline 150 \\ +\ 75 \\ \hline 9.00 \end{array}$$

Answer 9 hours

Test 7—Question 4
Score Point 1

This response shows a correct complete process, but a computational error results in an incorrect answer. The error is made when the student multiplies 12 by 45, getting 650 instead of 540. Therefore, this response receives a Score Point 1.

SCORE POINT 1

4 Lisa works 45 minutes each day building shelves for her home. She completes the shelves in 12 days.

How many HOURS does it take Lisa to build the shelves?

Show All Work

$$\begin{array}{r} {\scriptstyle 1} \\ 12 \\ 45 \\ \hline {\scriptstyle 1}\ 60 \\ 580 \\ \hline 650 \end{array} \qquad 60\overline{)\,650}\ \begin{array}{l} 10 \\ 60 \\ \hline 500 \end{array}$$

Answer 10.9 hours

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SCORE POINT 0

4 Lisa works 45 minutes each day building shelves for her home. She completes the shelves in 12 days.

How many HOURS does it take Lisa to build the shelves?

Show All Work

$$\begin{array}{r} {\scriptstyle 1}\\ 45\\ \times\ 12\\ \hline {\scriptstyle 1}90\\ 450\\ \hline 540 \end{array}$$

Answer 540 hours

Test 7—Question 4
Score Point 0

This response shows an incorrect answer and an incomplete process. The student does not divide 540 by 60. Therefore, this response receives a Score Point 0.

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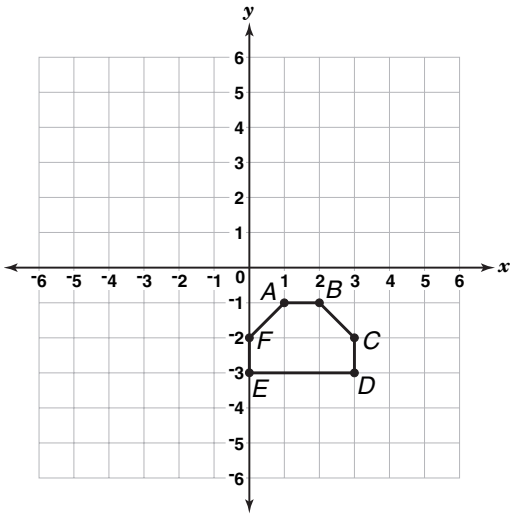
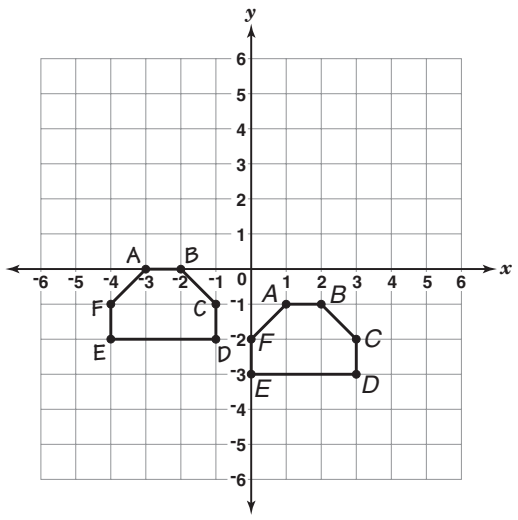
Test 7—Question 5: Geometry

5 Use your ruler as a straightedge.

Draw the image of the figure after a translation of 4 units to the left and 1 unit up.



Exemplary Response:

- 

Rubric:

2 points	Exemplary response
1 point	Correctly translates 4 units to the left OR Correctly translates 1 unit up
0 points	Other

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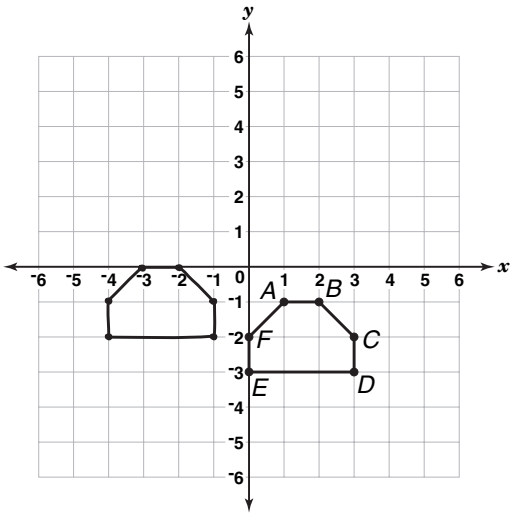
SCORE POINT 2

5 Use your ruler as a straightedge.

Draw the image of the figure after a translation of 4 units to the left and 1 unit up.



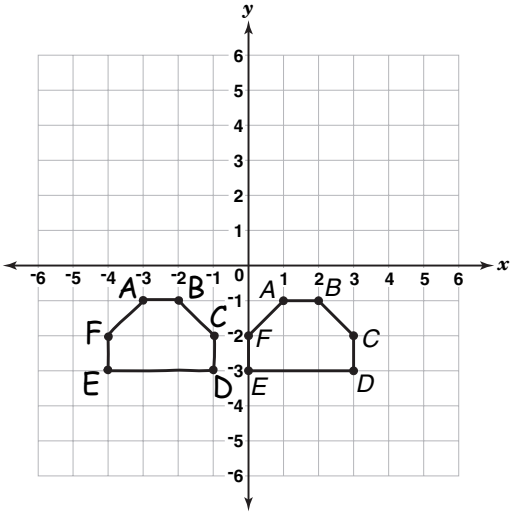
Test 7—Question 5 Score Point 2

This response matches the exemplary response contained in the rubric. The student shows the correct image after a translation of 4 units to the left and 1 unit up. The response receives a Score Point 2.

SCORE POINT 1

5 Use your ruler as a straightedge.

Draw the image of the figure after a translation of 4 units to the left and 1 unit up.



Test 7—Question 5 Score Point 1

This response shows the image after only one correct translation of 4 units to the left. The student does not translate the figure 1 unit up. Therefore, this response receives a Score Point 1.

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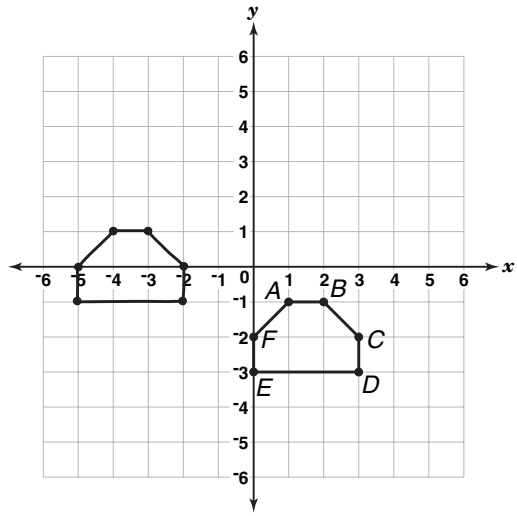
Test 7—Question 5
Score Point 0

This response does not show a correct image of either of the two translations. Therefore, this response receives a Score Point 0.

SCORE POINT 0

5 Use your ruler as a straightedge.

Draw the image of the figure after a translation of 4 units to the left and 1 unit up.



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Test 7—Question 6: Algebra and Functions

6 Consider the system of equations below.

$$3x + 2y = {}^{-}4$$
$$y = {}^{-}2x$$

Solve the system of equations for x and y.

Show All Work

Answer $x =$ _____, $y =$ _____

Exemplary Response:

- $x = 4, y = {}^{-}8$

Sample Process:

- $3x + 2y = {}^{-}4$
  $3x + 2({}^{-}2x) = {}^{-}4$
  $3x - 4x = {}^{-}4$
  ${}^{-}x = {}^{-}4$
  $x = 4$

  $y = {}^{-}2x$
  $y = {}^{-}2(4)$
  $y = {}^{-}8$

OR

- Other valid process

Rubric:

2 points	Exemplary response
1 point	Correct complete process; error in computation OR Correct values reversed on the answer lines
0 points	Other

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Test 7—Question 6
Score Point 2

This response matches the exemplary response contained in the rubric. The student shows the correct answer of 4 and $^{-}8$. The response receives a Score Point 2.

SCORE POINT 2

6 Consider the system of equations below.

$$3x + 2y = {}^{-}4$$
$$y = {}^{-}2x$$

Solve the system of equations for x and y.

Show All Work

3x + 2y = -4
3x + 2(-2x) = -4
3x + -4x = -4

$\frac{-x}{-1} = \frac{-4}{-1}$

x = 4

y = -2x
y = -2(4)
y = -8

Answer $x =$ 4, $y =$ -8

Test 7—Question 6
Score Point 1

This response shows a correct complete process, but computational errors result in an incorrect answer. A computational error is made when the student divides $^{-}16$ by 2, getting $^{-}7$ instead of $^{-}8$. Therefore, this response receives a Score Point 1.

SCORE POINT 1

6 Consider the system of equations below.

$$3x + 2y = {}^{-}4$$
$$y = {}^{-}2x$$

Solve the system of equations for x and y.

Show All Work

3x + 2(-2x) = -4
3x + -4x = -4
-x = -4
x = 4

3(4) + 2y = -4
12 + 2y = -4
y = -7

$\frac{2y}{2} = \frac{-16}{2}$

Answer $x =$ 4, $y =$ -7

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SCORE POINT 0

6 Consider the system of equations below.

$$3x + 2y = {}^{-}4$$
$$y = {}^{-}2x$$

Solve the system of equations for x and y.

Show All Work

$3x + 2y = -4$
$3x + 2(0) = -4$
$3x = -4$
$\frac{1}{3}(3x) = \frac{1}{3}(-4)$
$x = \frac{-4}{3}$

$y = -2x$
$y = \frac{-2}{1}(\frac{-4}{3})$
$y = \frac{8}{3}$

Answer $x = \frac{-4}{3}$, $y = \frac{8}{3}$

Test 7—Question 6
Score Point 0

This response shows an incorrect answer and an incorrect process. Therefore, this response receives a Score Point 0.

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Test 7—Question 7: Data Analysis and Probability

7 Greg asked 17 people at the mall to name their favorite radio station. His results are shown in the table below.

Favorite Radio Station

Station	Number of People
A	2
B	5
C	4
D	2
E	4

From the survey, Greg concluded that the favorite radio station of students at his school is Station B. Greg's school has a population of 4,000 students.

On the lines below, give two different reasons why Greg's conclusion is NOT reasonable.

1) _____

_____

2) _____

_____

Exemplary Response:

Explanations equivalent to the following:

- The survey sample size is too small.

AND

- We don't know if Greg surveyed students who attend the school.

OR

- Other valid explanations

Rubric:

2 points	Exemplary response
1 point	One correct explanation
0 points	Other

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SCORE POINT 2

7 Greg asked 17 people at the mall to name their favorite radio station. His results are shown in the table below.

Favorite Radio Station

Station	Number of People
A	2
B	5
C	4
D	2
E	4

From the survey, Greg concluded that the favorite radio station of students at his school is Station B. Greg's school has a population of 4,000 students.

On the lines below, give two different reasons why Greg's conclusion is NOT reasonable.

1) His conclusion is not reasonable. because he only asked 17 people, and 17 is not enough to accurately know what people like

2) The people at the mall may not have been from his school, plus many people that go to the mall are alike.

Test 7—Question 7
Score Point 2

This response matches the exemplary response contained in the rubric. The student gives two valid explanations for why the survey was not reasonable. The response receives a Score Point 2.

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Test 7—Question 7
Score Point 1

This response shows only one valid explanation for why the survey was not reasonable. Therefore, this response receives a Score Point 1.

SCORE POINT 1

7 Greg asked 17 people at the mall to name their favorite radio station. His results are shown in the table below.

Favorite Radio Station

Station	Number of People
A	2
B	5
C	4
D	2
E	4

From the survey, Greg concluded that the favorite radio station of students at his school is Station B. Greg's school has a population of 4,000 students.

On the lines below, give two different reasons why Greg's conclusion is NOT reasonable.

1) didn't ask everyone in school

2) didn't ask enough students

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SCORE POINT 0

7 Greg asked 17 people at the mall to name their favorite radio station. His results are shown in the table below.

Favorite Radio Station

Station	Number of People
A	2
B	5
C	4
D	2
E	4

From the survey, Greg concluded that the favorite radio station of students at his school is Station B. Greg's school has a population of 4,000 students.

On the lines below, give two different reasons why Greg's conclusion is NOT reasonable.

1) He didn't ask everyone

2) More people could like another station

Test 7—Question 7
Score Point 0

This response shows no valid explanations for why the survey was not reasonable. Both explanations given by the student are too vague. Therefore, this response receives a Score Point 0.

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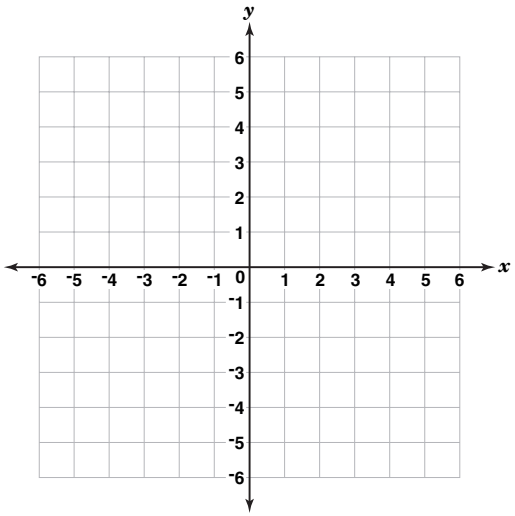
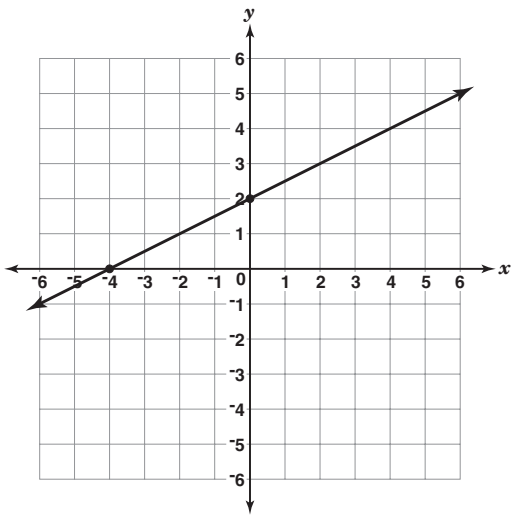
Test 7—Question 8: Algebra and Functions

8 Use your ruler as a straightedge.

Graph the equation $y = \frac{1}{2}x + 2$ on the coordinate plane below.



Exemplary Response:

- 

NOTES: If more than one line is drawn, a score of 0 points will be awarded.

If an incorrect point is plotted with no line drawn, a score of 0 points will be awarded.

Rubric:

2 points	Exemplary response
1 point	Correct slope of $\frac{1}{2}$
0 points	Other

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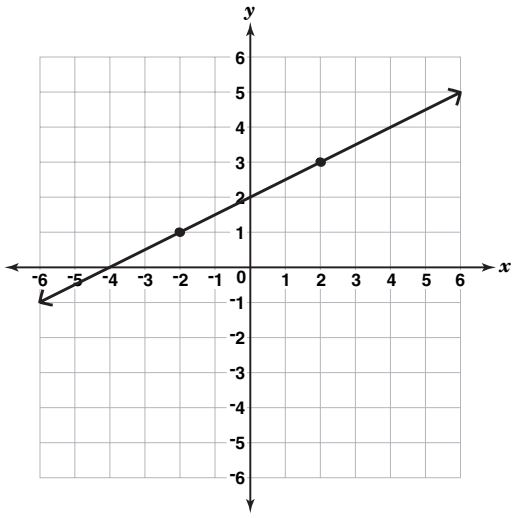
SCORE POINT 2

8 Use your ruler as a straightedge.

Graph the equation $y = \frac{1}{2}x + 2$ on the coordinate plane below.



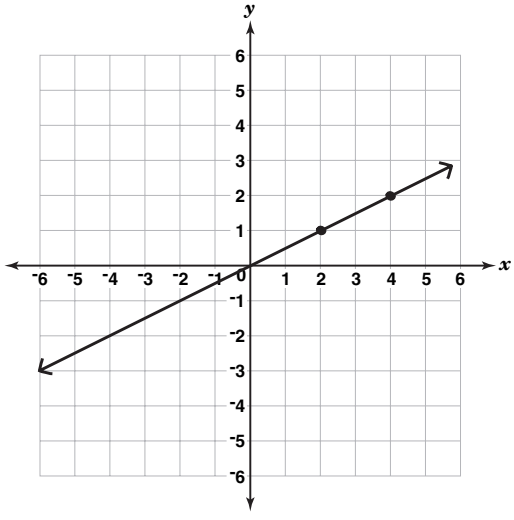
Test 7—Question 8 Score Point 2

This response matches the exemplary response contained in the rubric. The student shows the correct graph of the equation. The response receives a Score Point 2.

SCORE POINT 1

8 Use your ruler as a straightedge.

Graph the equation $y = \frac{1}{2}x + 2$ on the coordinate plane below.



Test 7—Question 8 Score Point 1

This response shows an incorrect graph of the equation. However, the student shows a correct slope. Therefore, this response receives a Score Point 1.

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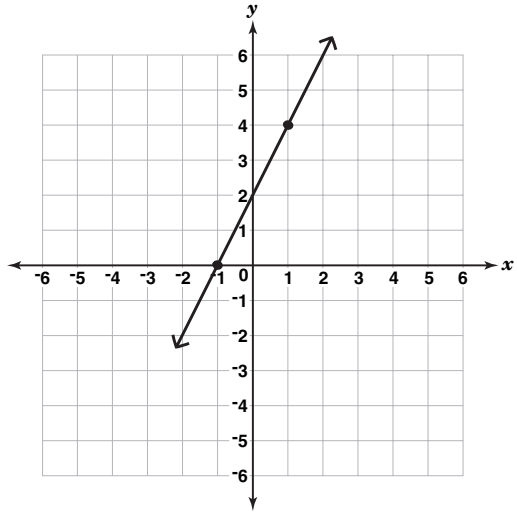
Test 7—Question 8
Score Point 0

This response shows an incorrect graph of the equation. The student shows an incorrect slope and *x*-intercept. Therefore, this response receives a Score Point 0.

SCORE POINT 0

8 Use your ruler as a straightedge.

Graph the equation $y = \frac{1}{2}x + 2$ on the coordinate plane below.



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Test 8—Question 1: Data Analysis and Probability

1 Larry is having dinner at a restaurant that offers 6 different main courses, 7 different side dishes, 4 different drinks, and 4 different desserts. For dinner, Larry will choose a main course, a side dish, a drink, and a dessert.

From how many different combinations can Larry choose dinner?

Show All Work

Answer _____ combinations

Exemplary Response:

- 672 ways

Sample Process:

- $7 \times 6 \times 4 \times 4 = 672$

OR

- Other valid process

Rubric:

2 points	Exemplary response
1 point	Correct complete process; error in computation
0 points	Other

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Test 8—Question 1
Score Point 2

This response matches the exemplary response contained in the rubric. The student shows the correct answer of 672 combinations. The response receives a Score Point 2.

SCORE POINT 2

1 Larry is having dinner at a restaurant that offers 6 different main courses, 7 different side dishes, 4 different drinks, and 4 different desserts. For dinner, Larry will choose a main course, a side dish, a drink, and a dessert.

From how many different combinations can Larry choose dinner?

Show All Work

$6 \cdot 7 \cdot 4 \cdot 4 = 672$

Answer 672 combinations

Test 8—Question 1
Score Point 1

This response shows a correct complete process. However, a computational error results in an incorrect answer. The computational error is made when the student multiplies 96 by 7, getting 572 instead of 672. Therefore, this response receives a Score Point 1.

SCORE POINT 1

1 Larry is having dinner at a restaurant that offers 6 different main courses, 7 different side dishes, 4 different drinks, and 4 different desserts. For dinner, Larry will choose a main course, a side dish, a drink, and a dessert.

From how many different combinations can Larry choose dinner?

Show All Work

$6 \times 4 = 24$ $\quad 24 \times 4 = 96$ $\quad 96 \times 7 = 572$

Answer 572 combinations

Test 8—Question 1
Score Point 0

This response shows an incorrect answer with no process shown. Therefore, this response receives a Score Point 0.

SCORE POINT 0

1 Larry is having dinner at a restaurant that offers 6 different main courses, 7 different side dishes, 4 different drinks, and 4 different desserts. For dinner, Larry will choose a main course, a side dish, a drink, and a dessert.

From how many different combinations can Larry choose dinner?

Show All Work

I add all them up

Answer 21 combinations

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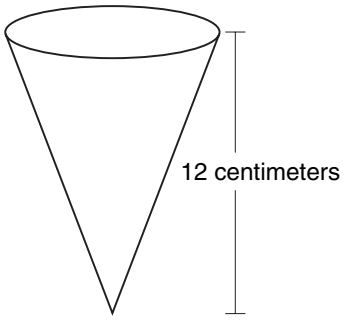
Test 8—Question 2: Measurement

2 The ratio of the height of the cone shown in the diagram below to the diameter of the base is 2 to 1.



What is the volume, in cubic centimeters, of the cone?

Show All Work

Answer _____ cubic centimeters

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Exemplary Response:

- 113.04 cubic centimeters

Sample Process:

- $\frac{d}{12} = \frac{1}{2}$

  $2d = 12$

  $d = 6$

If diameter is 6, then radius is 3.

$V = \frac{1}{3}\pi r^2 h$

$= \frac{1}{3}(3.14)(9)(12)$

$= 113.04$

OR

- Other valid process

Rubric:

2 points	Exemplary response
1 point	Correct process for determining the radius of the cone OR Correct complete process; error in computation
0 points	Other

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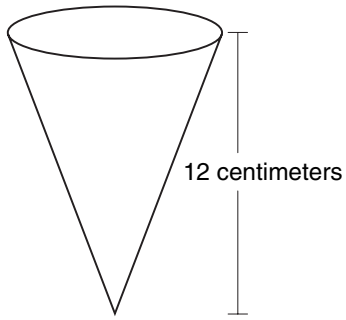
SCORE POINT 2

2 The ratio of the height of the cone shown in the diagram below to the diameter of the base is 2 to 1.



What is the volume, in cubic centimeters, of the cone?

Show All Work

$$V = \frac{1}{3}\pi r^2 h$$

$$V = \frac{1}{3}(3.14)(3^2)(12)$$

$$V = \frac{1}{3}(3.14)(9)(12)$$

$$V = 113.04$$

Answer 113.04 cubic centimeters

Test 8—Question 2
Score Point 2

This response matches the exemplary response contained in the rubric. The student shows the correct answer of 113.04 cubic centimeters. The response receives a Score Point 2.

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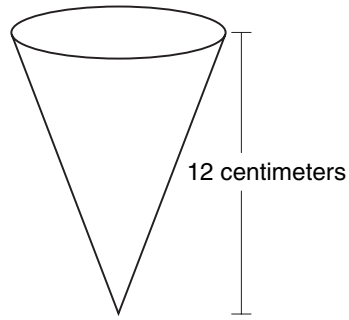
Test 8—Question 2
Score Point 1

This response shows a correct complete process. However, a computational error results in an incorrect answer. The computational error is made when the student multiplies the values in the formula, getting 101.736 instead of 113.04. Therefore, this response receives a Score Point 1.

SCORE POINT 1

2 The ratio of the height of the cone shown in the diagram below to the diameter of the base is 2 to 1.



What is the volume, in cubic centimeters, of the cone?

Show All Work

$\frac{12}{2} = 6$

$V = \frac{1}{3} \times \pi \times$ square of radius $\times$ height

$V = \frac{1}{3} \times \pi \times 9 \times 12 =$

Answer 101.736 cubic centimeters

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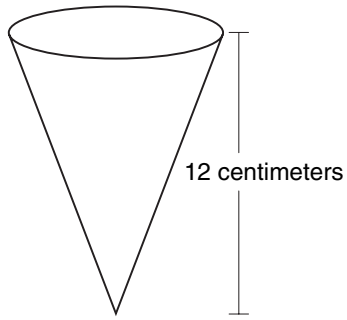
SCORE POINT 0

2 The ratio of the height of the cone shown in the diagram below to the diameter of the base is 2 to 1.



What is the volume, in cubic centimeters, of the cone?

Show All Work

$$\frac{1}{3} \cdot \frac{22^2}{7} \cdot 12$$

$$(.3) \cdot (9.87) \cdot (12)$$

$$\approx 35.532$$

Answer 35.532 cubic centimeters

Test 8—Question 2 Score Point 0

This response shows an incorrect answer and an incorrect process. The student uses an incorrect formula for the volume of a cone. Therefore, this response receives a Score Point 0.

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Test 8—Question 3: Algebra and Functions

3 A repair person charges a flat fee plus an hourly rate. The equation below gives the total cost, c, in terms of the number of hours, h, of service.

$$c = 50h + 250$$

For 6 hours of service, the total cost is $550.

What is the hourly rate the repair person charges?

Answer $ _____

What is the flat fee the repair person charges?

Answer $ _____

Exemplary Response:

- $50

AND

- $250

Rubric:

2 points	Exemplary response
1 point	One correct component
0 points	Other

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SCORE POINT 2

3 A repair person charges a flat fee plus an hourly rate. The equation below gives the total cost, c, in terms of the number of hours, h, of service.

$$c = 50h + 250$$

For 6 hours of service, the total cost is $550.

What is the hourly rate the repair person charges?

Answer $ 50

What is the flat fee the repair person charges?

Answer $ 250

Test 8—Question 3 Score Point 2

This response matches the exemplary response contained in the rubric. The student shows the correct answers of $50 and $250. The response receives a Score Point 2.

SCORE POINT 1

3 A repair person charges a flat fee plus an hourly rate. The equation below gives the total cost, c, in terms of the number of hours, h, of service.

$$c = 50h + 250$$

For 6 hours of service, the total cost is $550.

What is the hourly rate the repair person charges?

Answer $ 50.00

What is the flat fee the repair person charges?

Answer $ 200.00

Test 8—Question 3 Score Point 1

This response shows a correct answer for the hourly rate, but the student shows an incorrect answer for the flat fee. Therefore, this response receives a Score Point 1.

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Test 8—Question 3
Score Point 0

This response shows incorrect answers on the answer lines. The student reverses the answers for the hourly rate and flat fee. Therefore, this response receives a Score Point 0.

SCORE POINT 0

3 A repair person charges a flat fee plus an hourly rate. The equation below gives the total cost, c, in terms of the number of hours, h, of service.

$$c = 50h + 250$$

For 6 hours of service, the total cost is $550.

What is the hourly rate the repair person charges?

Answer $ 250

What is the flat fee the repair person charges?

Answer $ 50.00

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Test 8—Question 4: Measurement

4 Mike is testing new batteries to determine if the batteries last as long as advertised. The actual life of one of the batteries was only 4 weeks, 2 days, and 13 hours even though the advertisement claimed it would last 3,000 hours.

What was the difference, in HOURS, between the advertised life of the battery and the actual life of the battery?

Show All Work

Answer _____ hours

Exemplary Response:

- 2,267 hours

Sample Process:

- Convert weeks to days:

  $4 \times 7 = 28$ days

  $28 + 2 = 30$ days

  Convert days to hours:

  $30 \times 24 = 720$ hours

  $720 + 13 = 733$ hours

  $3{,}000 - 733 = 2{,}267$ hours

OR

- Other valid process

Rubric:

2 points	Exemplary response
1 point	Correct process for converting time to hours OR Correct complete process; error in computation
0 points	Other

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Test 8—Question 4
Score Point 2

This response matches the exemplary response contained in the rubric. The student shows the correct answer of 2,267 hours. The response receives a Score Point 2.

SCORE POINT 2

4 Mike is testing new batteries to determine if the batteries last as long as advertised. The actual life of one of the batteries was only 4 weeks, 2 days, and 13 hours even though the advertisement claimed it would last 3,000 hours.

What was the difference, in HOURS, between the advertised life of the battery and the actual life of the battery?

Show All Work

13 hours, 48 hours, 672 hours

2 days = 24 × 2 = 48 hours

4 weeks = 4 × 7 = 28 days

28 days = 28 × 24 = 672 hours

```
  13
+ 48      3,000
+672    - 733
 733      2267
```

Answer 2267 hours

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SCORE POINT 1

4 Mike is testing new batteries to determine if the batteries last as long as advertised. The actual life of one of the batteries was only 4 weeks, 2 days, and 13 hours even though the advertisement claimed it would last 3,000 hours.

What was the difference, in HOURS, between the advertised life of the battery and the actual life of the battery?

Show All Work

24 hours in a day

7 days in a week

$$\begin{array}{r} 7 \\ \times\ 4 \\ \hline 28 \end{array}$$ days

$$\begin{array}{r} {\scriptstyle 3} \\ 28 \\ \times\ 24 \\ \hline 112 \\ 560 \\ \hline 672 \end{array}$$ hours in 4 weeks

$$\begin{array}{r} 672 \\ +\ 48 \\ +\ 13 \\ \hline 733 \end{array}$$

Answer 733 hours

Test 8—Question 4
Score Point 1

This response shows an incorrect answer and an incomplete process. However, the student shows a correct process for converting 4 weeks, 2 days, and 13 hours into 733 hours. Therefore, this response receives a Score Point 1.

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Test 8—Question 4
Score Point 0

This response shows an incorrect answer and an incorrect process. The student does not use a correct process for determining the time in hours. Therefore, this response receives a Score Point 0.

SCORE POINT 0

4 Mike is testing new batteries to determine if the batteries last as long as advertised. The actual life of one of the batteries was only 4 weeks, 2 days, and 13 hours even though the advertisement claimed it would last 3,000 hours.

What was the difference, in HOURS, between the advertised life of the battery and the actual life of the battery?

Show All Work

4 week = 28
2 days = 48

```
   13
+3,000
 3089
```

Answer 3089 hours

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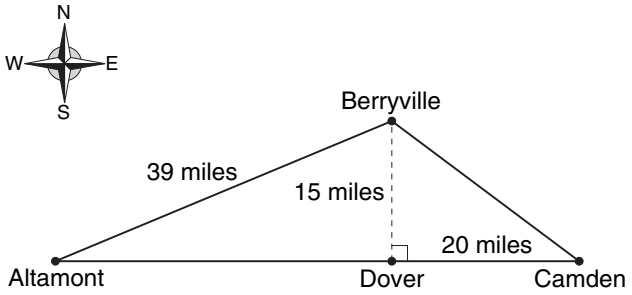
Test 8—Question 5: Problem Solving

5 Roads connecting four towns form a triangle, as shown in the mileage chart below.



Talia traveled from Altamont to Berryville to Camden to Dover and back to Altamont to deliver furniture.

What is the total distance, in miles, Talia traveled?

Show All Work

Answer _____ miles

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Exemplary Response:

- 120 miles

AND

- Correct complete process

Sample Process:

- Distance from Dover to Altamont:

$a^2 + 15^2 = 39^2$

$a^2 + 225 = 1{,}521$

$a^2 = 1{,}296$

$a = 36$

Distance from Camden to Berryville:

$20^2 + 15^2 = c^2$

$400 + 225 = c^2$

$625 = c^2$

$25 = c$

Perimeter:

$P = 39 + 25 + 20 + 36$

$= 120$

OR

- Other valid process

Rubric:

3 points	Exemplary response
2 points	Correct answer only OR Correct process for determining both missing distances OR Correct complete process; error in computation
1 point	Correct process for determining one of the missing distances
0 points	Other

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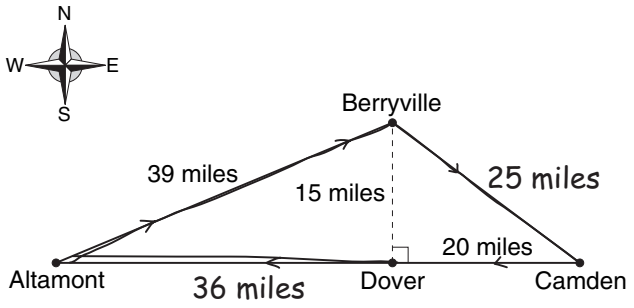
SCORE POINT 3

5 Roads connecting four towns form a triangle, as shown in the mileage chart below.



Talia traveled from Altamont to Berryville to Camden to Dover and back to Altamont to deliver furniture.

What is the total distance, in miles, Talia traveled?

Show All Work

39 + 25 + 20 + 36 = 120

Berryville - Camden

$15^2 + 20^2 = c^2$

$225 + 400 = c^2$

$625 = c^2$

$c = 25$

Dover - Altamont

$15^2 + b^2 = 39^2$

$225 + b^2 = 1521$

$b^2 = 1296$

$b = 36$

Answer 120 miles

Test 8—Question 5 Score Point 3

This response matches the exemplary response contained in the rubric. The student shows a correct complete process and the correct answer of 120 miles. The response receives a Score Point 3.

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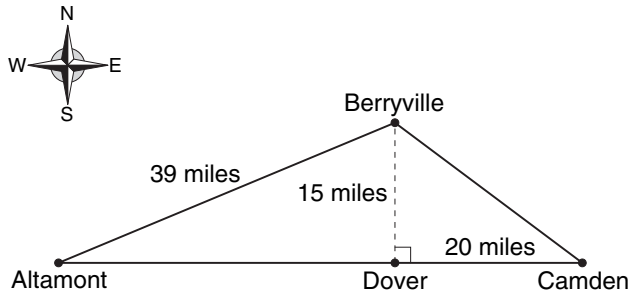
Test 8—Question 5
Score Point 2

This response shows a correct complete process. However, a computational error results in an incorrect answer. The computational error is made when the student adds 39, 25, 20, and 36, getting 122 instead of 120. Therefore, this response receives a Score Point 2.

SCORE POINT 2

5 Roads connecting four towns form a triangle, as shown in the mileage chart below.



Talia traveled from Altamont to Berryville to Camden to Dover and back to Altamont to deliver furniture.

What is the total distance, in miles, Talia traveled?

Show All Work

$$\begin{array}{r} 39 \\ +\ 25 \\ +\ 20 \\ +\ 36 \\ \hline \end{array}$$

$$\begin{array}{r} a^2 + b^2 = c^2 \\ 15^2 + b^2 = 39^2 \\ 225 + b^2 = 1521 \\ -\ 225 \qquad -\ 225 \\ \hline \sqrt{b^2} \quad = \sqrt{1296} \\ b = 36 \end{array}$$

$$\begin{array}{r} a^2 + b^2 = c^2 \\ 15^2 + 20^2 = c^2 \\ 225 + 400 = c^2 \\ \sqrt{625} = \sqrt{c^2} \\ 25 = c \end{array}$$

Answer 122 miles

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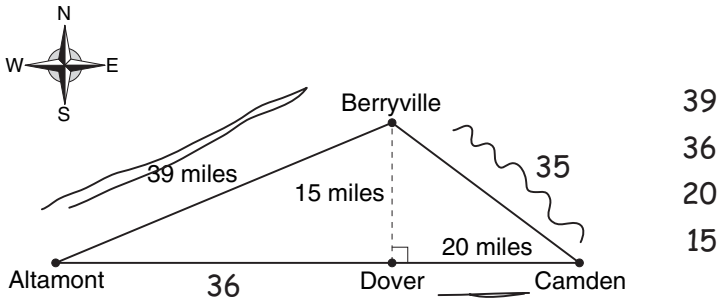
SCORE POINT 1

5 Roads connecting four towns form a triangle, as shown in the mileage chart below.



Talia traveled from Altamont to Berryville to Camden to Dover and back to Altamont to deliver furniture.

What is the total distance, in miles, Talia traveled?

Show All Work

$$\begin{array}{r} {}^{2} \\ 20\text{ m} \\ 39\text{ m} \\ 35\text{ m} \\ +\ 36\text{ m} \\ \hline 130 \end{array} \qquad \begin{array}{r} 20 \\ +\ 15 \\ \hline 35 \end{array}$$

$$15^2 + b^2 = 39^2$$
$$225 + b = 1521$$
$$\begin{array}{r} -\ 225 \\ \hline 0 \end{array} \qquad \begin{array}{r} -\ 225 \\ \hline 1296 \end{array}$$
$$b = \sqrt{1296}$$
$$b = 36$$

Answer 130 miles

Test 8—Question 5
Score Point 1

This response shows an incorrect answer on the answer line. However, the student shows a correct process for determining the distance between Altamont and Dover. Therefore, this response receives a Score Point 1.

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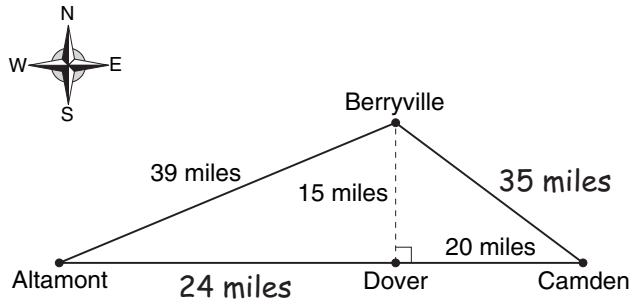
Test 8—Question 5
Score Point 0

This response shows an incorrect answer and an incorrect process. Therefore, this response receives a Score Point 0.

SCORE POINT 0

5 Roads connecting four towns form a triangle, as shown in the mileage chart below.



Talia traveled from Altamont to Berryville to Camden to Dover and back to Altamont to deliver furniture.

What is the total distance, in miles, Talia traveled?

Show All Work

$a^2 + b^2 = c^2$
$15^2 + 20^2 = c^2$
$C^2 = 35$

15
+ 20

$a^2 + b^2 = c^2$
$15^2 + b^2 = 39^2$
$b^2 = 24$

39
15
24

35
+ 44
39
118

Answer 118 miles

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Test 8—Question 6: Problem Solving

6 Paul plans to install a border along the perimeter of a square floor. The area of the floor is 121 square feet. The cost of the border and supplies is $2.39 per foot, including tax.

How much money will it cost to install the border?

Show All Work

Answer $ _____

Exemplary Response:

- $105.16

AND

- Correct complete process

Sample Process:

- Area = 121 square feet, so $\sqrt{121} = 11$

  $11 \times 4 = 44$

  $(44)(2.39) = 105.16$

OR

- Other valid process

Rubric:

3 points	Exemplary response
2 points	Correct answer only OR Correct complete process; error in computation
1 point	Correct process for determining perimeter of room OR Correct process for determining the cost of one or more sides
0 points	Other

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Test 8—Question 6
Score Point 3

This response matches the exemplary response contained in the rubric. The student shows a correct complete process and the correct answer of $105.16. The response receives a Score Point 3.

SCORE POINT 3

6 Paul plans to install a border along the perimeter of a square floor. The area of the floor is 121 square feet. The cost of the border and supplies is $2.39 per foot, including tax.

How much money will it cost to install the border?

Show All Work

$\sqrt{121} = 11 \times 4 = 44$

$$\begin{array}{r} {\scriptstyle 1\ 3} \\ 2.39 \\ \times\ \ 44 \\ \hline {\scriptstyle 1}956 \\ +\ 9560 \\ \hline 105.16 \end{array}$$

Answer $ 105.16

Test 8—Question 6
Score Point 2

This response shows a correct complete process. However, a computational error results in an incorrect answer. The computational error is made when the student multiplies 2.39 and 44, getting 105.10 instead of 105.16. Therefore, this response receives a Score Point 2.

SCORE POINT 2

6 Paul plans to install a border along the perimeter of a square floor. The area of the floor is 121 square feet. The cost of the border and supplies is $2.39 per foot, including tax.

How much money will it cost to install the border?

Show All Work

$\sqrt{121} = 11$

$$\begin{array}{r} 11 \\ 4 \\ \hline 44 \end{array}$$

$$\begin{array}{r} {\scriptstyle 1\ 3} \\ 2.39 \\ 44 \\ \hline 1956 \\ 9500 \\ \hline 105.10 \end{array}$$

Answer $ 105.10

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SCORE POINT 1

6 Paul plans to install a border along the perimeter of a square floor. The area of the floor is 121 square feet. The cost of the border and supplies is $2.39 per foot, including tax.

How much money will it cost to install the border?

Show All Work

$\sqrt{121} = \sqrt{x^2}$ x = side of square
11 = x
feet

$$\begin{array}{r} 2.39 \\ \times \quad 11 \\ \hline {}^{1}239 \\ +\ 2390 \\ \hline \$26.29 \end{array}$$

Answer $ 26.29

Test 8—Question 6
Score Point 1

This response shows an incorrect answer on the answer line. However, the student shows a correct process for determining the cost to place a border on one side of the room. Therefore, this response receives a Score Point 1.

SCORE POINT 0

6 Paul plans to install a border along the perimeter of a square floor. The area of the floor is 121 square feet. The cost of the border and supplies is $2.39 per foot, including tax.

How much money will it cost to install the border?

Show All Work

121 ÷ 2.39 = $50.63

Answer $ 50.63

Test 8—Question 6
Score Point 0

This response shows an incorrect answer and an incorrect process. Therefore, this response receives a Score Point 0.

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Test 8—Question 7: Problem Solving

7 For a festival, one flag will be placed every 8 YARDS to form a circular pattern that is $\frac{1}{4}$ MILE long.

What is the exact number of flags that will be placed to form the circular pattern?

Show All Work

Answer _____ flags

Exemplary Response:

- 55 flags

AND

- Correct complete process

Sample Process:

- $\frac{1}{4} \times 1{,}760 = 440$ yards

  $440 \div 8 = 55$

OR

- Other valid process

Rubric:

2 points	Exemplary response
1 point	Correct answer only OR Correct complete process; error in computation
0 points	Other

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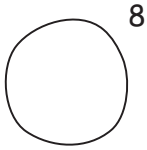
SCORE POINT 2

7 For a festival, one flag will be placed every 8 YARDS to form a circular pattern that is $\frac{1}{4}$ MILE long.

What is the exact number of flags that will be placed to form the circular pattern?

Show All Work



1 mile = 1,760 yds ÷ 4 = 440 yds
440 ÷ 8 = 55

Answer 55 flags

Test 8—Question 7 Score Point 2

This response matches the exemplary response contained in the rubric. The student shows a correct complete process and the correct answer of 55 flags. The response receives a Score Point 2.

SCORE POINT 1

7 For a festival, one flag will be placed every 8 YARDS to form a circular pattern that is $\frac{1}{4}$ MILE long.

What is the exact number of flags that will be placed to form the circular pattern?

Show All Work

$$1{,}760 \times .25 = \frac{445}{8} = \begin{matrix}\text{round up}\\ 56\end{matrix} 55.625$$

Answer 56 flags

Test 8—Question 7 Score Point 1

This response shows a correct complete process. However, a computational error results in an incorrect answer. The computational error is made when the student multiplies 1,760 by 0.25, getting 445 instead of 440. Therefore, this response receives a Score Point 1.

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Test 8—Question 7
Score Point 0

This response shows an incorrect answer and an incomplete process. The student does not divide 440 by 8. Therefore, this response receives a Score Point 0.

SCORE POINT 0

7 For a festival, one flag will be placed every 8 YARDS to form a circular pattern that is $\frac{1}{4}$ MILE long.

What is the exact number of flags that will be placed to form the circular pattern?

Show All Work

$4\overline{)1760}$ $\quad 440$

1 mile = 1760 yds

Answer 440 flags

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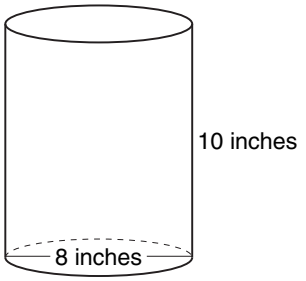
Test 8—Question 8: Measurement

8 Consider the cylinder shown below.



What is the surface area, in square inches, of the cylinder?

Show All Work

Answer _____ square inches

Exemplary Response:

- 351.68 square inches

Sample Process:

- $SA = 2\pi r^2 + 2\pi rh$
  $= 2(3.14)(16) + 2(3.14)(4)(10)$
  $= 32(3.14) + 80(3.14)$
  $= 100.48 + 251.2$
  $= 351.68$

OR

- Other valid process

Rubric:

2 points	Exemplary response
1 point	Substitution of correct values in the correct formula OR Correct complete process; error in computation
0 points	Other

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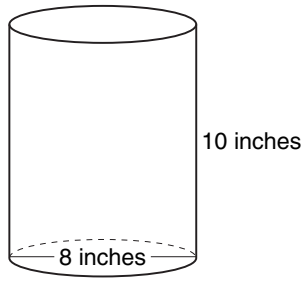
Test 8—Question 8
Score Point 2

This response matches the exemplary response contained in the rubric. The student shows the correct answer of 351.68 square inches. The response receives a Score Point 2.

SCORE POINT 2

8 Consider the cylinder shown below.



What is the surface area, in square inches, of the cylinder?

Show All Work

$\sqrt[4]{8}=$

$2\pi r^2 + 2\pi rh$

$2 \cdot 3.14 \cdot 4^2 + 2 \cdot 3.14 \cdot 4 \cdot 10$

$2 \cdot 3.14 \cdot 16 + 2 \cdot 3.14 \cdot 40$

$6.28 \cdot 16 + 6.28 \cdot 40$

$100.48 + 251.2 =$

351.68

Answer 351.68 square inches

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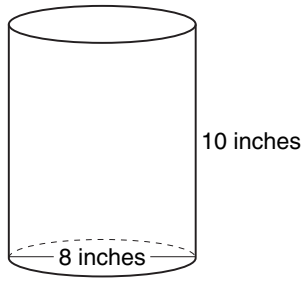
SCORE POINT 1

8 Consider the cylinder shown below.



What is the surface area, in square inches, of the cylinder?

Show All Work

$SA = 2\pi r^2 + 2\pi rh$

100.48

$2 \cdot 3.14 \cdot 4^2 + 2 \cdot 3.14 \cdot 4 \cdot 10$

16

6.28 100.48 6.28 25.12 251.2

100.48 + 251.2

Answer 381.64 square inches

Test 8—Question 8 Score Point 1

This response shows a correct complete process. However, a computational error results in an incorrect answer. The computational error is made when the student adds 100.48 and 251.2, getting 381.64 instead of 351.68. Therefore, this response receives a Score Point 1.

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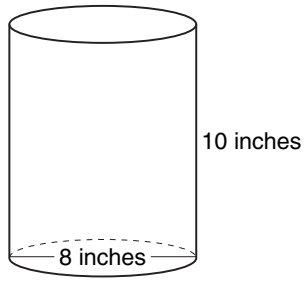
Test 8—Question 8
Score Point 0

This response shows an incorrect answer and an incorrect process. The student uses incorrect values for the radius. The student also adds before multiplying in the third step. Therefore, this response receives a Score Point 0.

SCORE POINT 0

8 Consider the cylinder shown below.



What is the surface area, in square inches, of the cylinder?

Show All Work

$2\pi r^2 + 2\pi rh$

$2 \cdot 3.14 \cdot 4 + 2 \cdot 3.14 \cdot 8 \cdot 10$

$6.28 \cdot 4 + 2 \cdot 3.14 \cdot 8 \cdot 10$

$25.12 + 2 \cdot 3.14 \cdot 8 \cdot 10$

$27.12 \cdot 3.14 \cdot 8 \cdot 10$

$85.1568 \cdot 8 \cdot 10$

$681.2544 \cdot 10$

6812.544

Answer 6812.544 square inches

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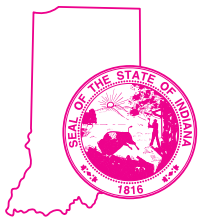

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